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REVIEWS.

A New Book on Elevator Construction.

Reviewed by WILLIAM H. BRYAN*, M. Am. Soc. M. E.

HYDRAULIC ELEVATORS—THEIR DESIGN, CONSTRUCTION, OPERATION, CARE AND MANAGEMENT.—By William Baxter, Jr., author of "Practical Talks on Electricity," "Switchboards," Etc. New York: McGraw-Hill Book Co. Cloth; 6 × 9 ins.; pp. 326; 260 text illustrations. $2.50, net.

This is a republication in book form of a series of notable papers which have been appearing for some time past in "Power." The profession is to be congratulated that they are now available in convenient form for easy reference and for permanent preservation. There is a wealth of detail, a fullness of illustration, and a clearness of text which are in every way commendable. The subject is one to which the author had evidently given long study, and with which he was on the most intimate terms of familiarity.

The author begins with a general discussion of the fundamental principles governing the design of hydraulic elevators, taking up first their simplest forms, and advancing gradually to the most complicated. Among the types discussed are direct and geared, plunger and piston types, high- and low-lift machines, high- and low-pressure systems, vertical plunger elevators, both inverted and upright, direct plunger machines, and horizontal machines, both "pulling" and "pushing." The considerations governing the selection of the type best suited to any particular case are fully gone into, as well as the detailed construction of each. The differences between the same types as constructed by different builders are fully explained. The interesting subjects of counterbalancing, both as to car and ropes, and methods of control by hand ropes, levers, wheels and electricity, are fully gone into. A chapter is devoted to double-power systems which tend to regulate the consumption of power in proportion to the load. The disorders to which elevators are heir, and their remedies, are discussed. Directions are given as to operation and maintenance, particularly as to leaks, accumulation of air, settling and bouncing of cars, the stretching of ropes, and the various forms of safeties. Also the use of accumulators, and the purposes of main and pilot valves, etc. A great deal of attention is given to electric valve control which, as applied to hydraulic elevators, is, however, of limited use and interest.

A plan of cylinder lubrication which has come into considerable use in the West is not mentioned by the author, namely that of collecting all the greasy condensation around the plant, from grease extractors and other drains, and pumping it into the elevator system. Neither does he mention those especially-made soap preparations which are often added to the water for a similar purpose.

To the designing and constructing engineer this work is invaluable, as it is also to the operating engineer. If criticism of any kind were in order it might be that the treatment is, if anything, too detailed, to the extent that little if any attention is given to the broader problems of elevator service. The author has evidently taken his subject seriously and literally, and confined his discussions strictly to the title matter. While he gives us ample ground upon which to base a choice among the various forms of the hydraulic elevator, he does not help us to solve the larger problems—such as the conditions which govern the selection of the particular type of elevator, whether hydraulic, electric or even steam. A comparison of these different types by so eminent an authority would have been interesting, particularly on the points of safety, reliability, uniformity of service, cost of operation and maintenance, simplicity of plant, and space occupied. The author does not discuss the general design of elevator systems, as to the number of elevators, their speed, size and location of cars—whether local or express—as adapted to the needs of any given type of building. Nor does he give any rule for determining the pumping capacity required, or the sizes of pipes and tanks. Neither is there any discussion as to methods of pumping water or maintaining pressure, whether such pumps should be high or low duty, simple or compound, steam or electric driven, reciprocating or centrifugal.

The upright plunger type of elevator, which is dismissed with scarcely a paragraph, was until a few years ago the standard in many western cities. A large number of them, geared two to one, are in successful operation to-day, and as they differ in important details from other types to which much space is given, they have an interest to many engineers in charge of plants. The disadvantage of this form is, of course, the greatly increased weight which the plunger must carry, but this weight is at a much lower height in the building, and the pipe connections are shorter and more direct. Few if any such plants are, however, being installed nowadays.

The author points out very clearly the importance of a thorough understanding of an elevator system by those operating it, and the value of skill in its care and maintenance. The safety of the passenger is of course the prime consideration, and those adjustments and repairs which bear directly on this point are paramount. Next in order come reliability of service, durability and efficiency. The present popularity of the electric elevator, and its development for the high speeds and long travels for which it has heretofore been believed to be unsuited, would seem to indicate a waning interest in the hydraulic machine. Nevertheless, the hydraulic elevators already in use must be maintained, and this alone would amply justify this book. Furthermore, the hydraulic elevator will aways have friends who will continue its installation and use. Nor would the reviewer deny that there are still fields of service where it may legitimately dispute the ground with its modern rival.

A minor defect of the work is the placing in different parts of the book of closely related chapters, which it would seem might better be brought together. The typography of the book is excellent, its illustrations commendable, and there is a carefully-arranged index. Taken as a whole it is a book of decided interest and value.

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COMMENTARY ON THE SCIENCE OF ORGANIZATION AND BUSINESS DEVELOPMENT.—By Robert T. Frank, LL.B. (of the Chicago Bar). Chicago, Ill.: Chicago Commercial Publishing Co. Cloth; 5½ × 8 ins.; pp. 278. $2.75.

This is a third and revised edition of a book on the legal side of the organization, financing and management of corporations. The object of the book, as stated in the preface, is to present in a brief and concise form a general statement of the important practical questions relating to business organization and the well-settled legal principles necessary for a proper application of the various plans and modes of procedure discussed.

The book is not intended to enable its readers to dispense with legal services but to give such an explanation of the law and approved procedure relating to corporate organization and financing as will be of value to those having the responsibilities of such organizations and also to lawyers who have not made a specialty of this particular line.

The advantages of a corporation as compared with an individual enterprise are outlined, and the organization, financing, capitalization, management, accounting methods, rights and liabilities of stockholders, etc., are dealt with. The matter of reorganization and consolidation of enterprises is covered also, and the evils of "stock jobbing" are pointed out. One chapter deals with the promotion of enterprises, including such matters as the commercial values of trade marks and patents; a special section of this chapter is devoted to mining enterprises. The appendix includes forms of contract, assignment, option, etc., and a draft of suitable by-laws; also a synopsis of the corporation laws of New Jersey, Maine and South Dakota, and the Illinois law governing the operation of foreign (or outside) corporations within that state. The book in printed in large clear type.

APPLIED MECHANICS.—Embracing Strength and Elasticity of Materials, Theory and Design of Structures, Theory of Machines, and Hydraulics. A Text-Book for Engineering Students. By David Allan Low, M. Inst. M. E., Professor of Engineering, East London College (University of London). London, New York and Bombay: Longmans, Green & Co. Cloth; 5½ × 8½ ins.; pp. 551; 850 illustrations in the text. $2.75, net.

The range of applications of mechanics dealt with in this text is much larger than common in similar works. Taking account of this and the great number of working examples given (some 700 to 800, largely original and well planned), the book is to be set down as excellent. We must couple with this the warning that the selection of subjects is to a large part in the field of machines, so that the mechanical engineer's interests are more specially represented. The author clearly defines his book as a text for instruction (school and self-study), but of course a good text will always be used for reference also. Both purposes demand that the applications of mechanics to engineering should be covered as comprehensively as possible; and when we say mechanics in this connection we mean chiefly dynamics, since merely geometrical or kinematic relationship are less in need of explanation. On this score the author might be blamed, mildly, for choosing his applications mainly from one field. But this reproach cannot be serious so long as we continue to lack a thorough and complete treatise on Applied Mechanics.

CANALS AND TRADERS.—The Argument Pictorial, As Applied to the Report of the Royal Commission on Canals and Waterways. By Edwin A. Pratt, Author of "British Canals," etc. London, England: P. S. King & Son. Paper; 5½ × 8½ ins.; pp. 123; numerous folding and other plates. 1s., net; American price, 50 cts.

The report of the Royal Commission on Canals and Waterways of Great Britain was recently reviewed in these columns. As may be remembered, a majority of the Commission recommended that the nation should acquire and improve a network of canals radiating from central England to the estuaries of the Thames, the Severn, the Mersey and the Humber. A minority of the Commission, including some of the members of greatest expert knowledge, advised that inland waterway transportation, under conditions in Great Britain, could not compete, even when state-supported, with railway transportation.

The purpose of this book is to show that the minority is correct in its position. The author says in his summary that inland waterways can serve the interests only of a strictly limited number of shippers, who have no right to demand

that the whole country should be taxed for their special advantage. The railway, he maintains, "is a far more efficient distributive agent, and one much better adapted to the special requirements of British trade."

It is of interest to note that this position is approved by the two principal British engineering journals, "The Engineer," and "Engineering." Thus in Great Britain, as in the United States, the expert engineers most competent to judge are not in agreement with those conducting the popular agitation in favor of waterway improvement.

Metallography.

Reviewed by BRADLEY STOUGHTON.*

METALLOGRAPHY.—By Cecil H. Desch, Graham Young Lecturer in Metallurgical Chemistry in the University of Glasgow. London, New York and Bombay: Longmans, Green & Co. Cloth; 4¾ × 7½ ins.; pp. 429; 14 plates and 108 text illustrations. $3, net.

It is only a few years ago that no general treatment of the subject of Metallography existed in book form, but so many have appeared in recent years it might be thought there is now little need for a further treatise. That this, however, is not true will be readily believed by those familiar with the breadth and diversity of the subject and may be proved by anyone who will read this book and observe what a gap in the literature it fills. The author is evidently a thorough student of Metallography and has presented the data in a scientific and scholarly manner which materially adds to the charm of the subject. Copious references enhance the value of the text, and it is noteworthy, in a book dealing with so progressive a science, that several of the references are close to the date of publication. Like Dr. Ruer, Dr. Desch has appended to the volume a collection of references to investigations upon the equilibrium diagrams of the metallic alloys, but in addition he has included the most important result of each investigation, thus affording a valuable table for ready reference.

Besides this appendix there are 18 chapters, of which the first five include a brief but very interesting historical introduction and a discussion of the diagram of thermal equilibrium. For students versed in physical chemistry the treatment of this phase of the subject is admirably adapted, but for metallurgists and for students not previously trained in the subject it is not presented in a sufficiently elementary form, so beginners would have to take up a simpler treatise first, or else obtain the elementary principles in some other way. In connection with the historical introduction it may be interesting to observe that this author ascribes the application of the theory of phases to alloys to von Jüptner LeChatelier. It is a pleasure to record that he, too, casts his vote against the use in English of the term "mixed crystals," for the German "mischkrystall."

The next three chapters, dealing with furnaces, pyrometry and the preparation and examination of microscopic sections, are not as thorough as some of the other portions of the book, but the different forms of apparatus and the methods described are carefully chosen, and much attention is given to means for obtaining the best and most accurate results, while common sources of error are pointed out. In these chapters we note especially the omission of apparatus and methods adapted for use in the works, in favor of the more delicate and stationary laboratory instruments.

Chapter IX., on crystallization, is very good and is illustrated by 15 excellent photo-micrographs. Chapters X. and XI., on undercooling and the metastable state and on diffusion, are also good, while the next following chapter, on the physical properties of alloys, is the best discussion of this subject seen by the reviewer since the last edition of Robert Austen's book, issued several years ago.

Chapter XIII., on electromotive force and corrosion, will be of special interest at the present time. In condensing so many data into a small space the author has been forced to sacrifice simplicity of languauge to some extent, and one's attention must be riveted closely to the text in order to follow the theories upon the first reading, but the author has mitigated this in the best possible way by presenting them in an interesting form.

Chapters XIV. and XV. deal with the construction of the equilibrium diagram and theoretical considerations upon the condition of metals in alloys and their relations to one another. They will be found especially useful by research students and investigators. The next chapter, upon plastic deformation, although theoretical in nature, is practical in its application and will be found highly interesting to all who deal with metals and alloys.

Chapter XVII. will be especially valued for its analytical discussion of the more recent theories dealing with the equilibrium diagram of iron and steel. Many would have been still further interested to read the author's discussion of the new views of the nature of Martensite and Troostite, which describes them as solutions of carbon in Beta and Alpha iron, respectively, but he does not mention them, although he refers to papers in which they are set forth.

The last chapter deals with the metallography of industrial alloys. It is necessarily brief and is rather theoretical than practical in its treatment. Indeed the book throughout lays somewhat more emphasis on theories than on the application of them. The reviewer has spoken of this characteristic so frequently here that it might be thought that he criticise it unfavorably. On the contrary, nothing is further from his intention. In a small volume one cannot do justice to both phases of so large and important a subject, and a presentation of these theories in scientific form was probably more needed at present than any other compilation of metallographical data. Dr. Desch has given us a volume for which all scientific men interested in metals will be deeply grateful and which no metallurgist can in any way afford to be without.

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TWENTIETH CENTURY HAND-BOOK FOR STEAM ENGINEERS AND ELECTRICIANS.—With Questions and Answers. A Practical Nontechnical Treatise on the Care and Management of Steam Engines, Boilers and Electric Machinery. By Calvin F. Swingle, Author of "Encyclopedia of Engineering," etc. Chicago, Ill.: Frederick J. Drake & Co. Leather; 4¾ × 7 ins.; pp. 1481; 696 illustrations, mostly in the text. $3.

An older reference text, by the same author, has been rewritten into this form. It is notable that it is called a "hand-book" and not a "pocket-book"—probably on account of its too generous proportions. The book is evidently intended for mechanics and those more interested in the practical operation of steam and electric machinery than in the design of such apparatus or of systems of which they form parts. While, of course, predominance of matter is such as relates to operation directly, yet the author prepares each section with simple expositions of the theory of the apparatus discussed or described. The important points for a stationary-engine driver to know are summed up after each section in a series of questions and answers.

THE USE OF WINDMILLS IN IRRIGATION IN THE SEMIARID WEST.—By P. E. Fuller, Irrigation Engineer, Irrigation Investigations, Office of Experiment Stations. Farmers' Bulletin 394, U. S. Department of Agriculture. Washington, D. C.: Pub. Doc. Paper; 6 × 9 ins.; pp. 44; 15 illustrations in the text.

Besides giving a considerable amount of information on the choice, installation and operation of windmills and windmill pumps, this bulletin also deals briefly with well sinking, reservoir construction, and other matters pertaining to the successful utilization of the water-supply made available by the use of windmill-driven pumps. By means of text and tabular matter there is presented in condensed form information regarding a number of windmill installations in western Kansas and Nebraska, eastern Colorado, and near Stockton, Cal. The bulletin is accompanied by a number of helpful illustrations. Being designed primarily for the use of farmers, the bulletin of course does not go into technical details which have characterized some of the earlier government publications on the same general subject, particularly those which have been included in the water-supply and irrigation papers of the U. S. Geological Survey.

THE DETHRONEMENT OF THE CITY BOSS.—A Study of the Commission Plan as Begun in Galveston, Developed and Extended in Des Moines, and Already Taken up by Many Other Cities, East and West. By John J. Hamilton. New York and London: G. P. Putnam's Sons & Wagnalls Co. Cloth; 5 × 7½ ins.; pp. 285; illustrated. $1.20, net.

An eminently readable description and critical discussion of the so-called commission form of city government is here presented. To a large extent the book consists of brief chapters devoted to explanations of the main features of the Des Moines charter, enacted by the state legislature in 1907, adopted by popular vote the same year, and in effect since April 1, 1908. A separate chapter outlines the commission plan adopted at Cedar Rapids, and other chapters summarize briefly experience under the commission plan at Galveston and Houston, Tex.; Leavenworth, Kans., and Des Moines and Cedar Rapids, Ia.—the remarks on the two Iowa cities being in some part a restatement of information already given in another form.

The appendixes give the text of the present Des Moines charter and also a charter less radical in form proposed in 1906, but which met with such a reception in the Legislature that it was withdrawn without being urged for passage. Another appendix presents a very interesting court decision upholding the constitutionality of the present Des Moines charter.

It will be understood, we presume, from what has preceded as well as from the title of the book that the author is a firm believer in the merits of the commission plan. He devotes a chapter to "Some Fundamental Objections Answered," but as this chapter occupies only some eight pages out of the whole volume, it would appear that the objections do not seem to him to be either many or serious. Considering the fact that the author esteems the commission plan so highly, his words in its praise may be considered as moderate. The book is well worth the attention of all interested in the much-needed task of improving the government of our American cities.

SURFACE WATER SUPPLY OF THE UNITED STATES.—1907-8. Part I., North Atlantic Coast. Prepared under the direction of M. O. Leighton, by H. K. Barrows and R. H. Bolster. Water-Supply Paper 241, U. S. Geological Survey. George Otis Smith, Director. Washington, D. C.: Pub. Doc. Paper; 5¾ × 9¼ ins.; pp. 356; six plates.

The stream-gaging operations of what is now known as the Water Resources Branch of the U. S. Geological Survey have been reported for a number of years past in various publications of the Survey. The greater number of these reports have appeared under the general title of Water-Supply and Irrigation Papers. The volume before us continues this series, but under a slightly different name; that is to say, the title, instead of including any reference to stream gagings, is as given above. The first instalment of the present report seems to follow essentially the same lines as the earlier reports: various streams are described, and then results of gagings are given, sometimes accompanied by rainfall figures and other related data.

It is interesting to note that an agreement as to geographical divisions employed by a number of different government departments has been effected and is followed in this bulletin. This agreement has been made between the Reclamation Service, the Forest Service, the Water Bureau and the Geological Survey. Under it the whole area of the United States has been divided into twelve parts, with boundaries coinciding "with certain natural drainage lines."

JOINT OUTLET SEWER FOR ELEVEN SEPARATE MUNICIPALITIES IN ESSEX AND UNION COUNTIES, NEW JERSEY.—A History and Description of an Accomplishment by Voluntary Joint Effort. By Alexander Potter, Chief Engineer. Second edition. New York: The Author [116 Liberty St., New York City]. Paper; 6 × 9½ ins.; pp. 110; one map; 19 folding and other plates and a few text illustrations.

The joint outlet sewer herein described serves Summit, South Orange, and other relatively small places and a part of the city of Newark. The

report on this work, first published in 1905, has been extended to include matter relating to operation embracing five years' experience with sewer leakage, which has been small, matters pertaining to sewer ventilation, etc. Digests of legislation authorizing the joint construction work is given, together with details of apportionment of cost, in accordance with an interesting scheme.

Pioneer Railway Building.

HOW WE BUILT THE UNION PACIFIC RAILWAY.—And Other Railway Papers and Addresses. By Major-General Grenville M. Dodge, Chief Engineer, Union Pacific Railway, 1866-1870. Flexible cloth; 6 × 9 ins.; pp. 171; 30 plates.

The building of those great railways that formed the final tie binding together the two seacoasts of the United States is a chapter in the engineering history of our country equalled only by the construction a half-century before of the Erie canal. Each of these enterprises had its serious problems; in the earlier one it was one of equipment and methods, in the later the question of personnel, for the surveying and construction of a heavy railway through virgin country, far from a base of supplies and inhabited by roving bands of hostile Indians, required men inured to hardship, fearless of danger, and possessed of that native engineering talent that makes new methods and discovers new tools when the occasion demands. Fortunately, the development of the country had reached just the right stage to demand the trans-continental roads at the end of the Civil War, for many officers and men, both in the engineering corps and in the line, who were discharged at the end of that great conflict, were possessed, by virtue of their four years' experience, of just those qualities which the railway location and construction engineer in the far west then needed and into that great engineering work they put their best efforts.

Among these men none was more prominent than Grenville M. Dodge, late Major-General of Volunteers, and before that an engineer on the railways being built in the states just west of the Mississippi. He became Chief Engineer of the Union Pacific R. R. in 1866 and carried it to a successful completion in the summer of 1869. No one is more familiar with those early days of railway building, when each mile of track meant more acres under cultivation and more settlers in an unopened country, no one is more capable of telling the story of how it was done. His book is a collection of addresses and papers on this great work, delivered or written within the past 20 years. As a story of engineering achievement under difficulties of pioneer construction that few to-day have occasion to experience and of a completed work more successful than the dreams of its projectors, the collection is well worth the reading.

THE DEPRECIATION OF FACTORIES.—Mines and Industrial Undertakings and Their Valuation. By Ewing Matheson, M. Inst. C. E. Fourth Edition, revised and enlarged. London, England: E. & F. N. Spon, Ltd. New York: Spon & Chamberlain. Cloth; 5½ × 8¾ ins.; pp. 230; one plate. $4, net.

So far as we know, this is the only book in the English language dealing with the very important subject of depreciation of industrial plants and municipal undertakings. The book was originally published in 1884, but gives evidence of having been brought well up to date in the present edition. Besides dealing with depreciation, the general subject of valuation of factories is taken up. This portion of the book forms Part II., and occupies about 70 pages.

The author first discusses the broad general subject of depreciation, and makes a comparison of public and private undertakings in their relation to depreciation. Going into the subject in detail, he then takes up preliminary expenses, good will, land and buildings, and plant and machinery. Next he considers "The Wasting Value of Terminable Undertakings" and also the effect of depreciation upon various classes of security holders. A few useful tables are presented, accompanied by diagrams and by worked examples. A few pages are devoted to Parliamentary Official Reports on municipal loans, sinking funds, and municipal depreciation allowances.

The book as a whole is a valuable presentation of depreciation and valuation. It contains many specific examples to illustrate the sound principles advocated and explained by the author.

WORK, WAGES, AND PROFITS.—Their Influence on the Cost of Living. By H. L. Gantt. New York: The Engineering Magazine. Cloth; 5 × 7½ ins.; pp. 194; 3 folding plates. $2.

Cooperation of employers and employes, preceded by careful and systematic study of the work to be accomplished and accompanied by skilled direction at every point, is the burden of this interesting and suggestive book. The volume might further be described as a popular exposition of the Task and Bonus System worked out by Mr. Frederick W. Taylor, Past-Pres. M. Am. Soc. M. E. As early as 1887 the author of this book was "employed by Mr. Frederick W. Taylor, then chief engineer of the Midvale Steel Works, to assist" in developing the system which he here outlines.

The volume as it now stands is made up of a series of papers and addresses delivered at various times and places, some of which have since been worked over for publication in "The Engineering Magazine." The two concluding chapters are entitled "Fixing Habits of Industry" and "Prices and Profits. A New Light on the Cost of Living."

The book can hardly fail to interest anyone who is at all concerned in the industrial problems of the day, either as affecting economic output, wage and labor conditions, or the cost of manufactured products to the "ultimate consumer."

SELF-TAUGHT MECHANICAL DRAWING AND ELEMENTARY MACHINE DESIGN.—Prepared for the Use of Practical Mechanics and Young Draftsmen. By F. L. Sylvester. With Additions by Erik Oberg, Associate Editor of "Machinery," Author of "Hand-Book of Small Tools," etc. New York: The Norman W. Henley Publishing Co. Cloth; 4¾ × 7¾ ins.; pp. 333; 218 illustrations in the text. $2.

A rather large range of subjects has been boiled down into this volume. The method of reduction, however, has been to eliminate entirely all but the most essential points of each subject and to treat thoroughly each point touched upon at all. The book is written in language adapted for those whose previous mathematical training includes only arithmetic.

The first five chapters (50 pages) give elementary instructions in mechanical drafting; the next four chapters (100 pages) take up in a practical way as much of the algebra, trigonometry, mechanics and principles of strength of materials as is absolutely needed by the ordinary draftsman; the remaining eleven chapters, constituting the main part of the book deal with the elements of machine design. The method of design is explained for the most common forms of cams, sprocket wheels, gearing, cone pulleys, bolts and screws, couplings and clutches, shafting and belting, flywheels for presses and punches, etc., trains of gears and quick return motions.

RAILWAY SPECIAL WORK.—By Walter E. Silsbee and Percy E. Blood. New York and London: McGraw-Hill Book Co. Flexible morocco; 4 × 7 ins.; pp. 105; 82 illustrations. $2.

Whoever wishes a complete library of good books on railway curves and turnouts, must add this little work to his collection, though it relates essentially to street railway track, not ordinary track (neither title-page nor introduction says so, however). It is neatly and accurately made up, and for its field, that of track specials, it is well conceived. The curve problems naturally belong in the treatment of street-railway specials; they seem to contain some novel cases. Transition curves are handled very briefly, too briefly for ready understanding, we believe.

REPORT OF THE ROYAL COMMISSION ON THE MURRAY WATERS.—Victoria, Australia: Pub. Doc. Paper; 8 × 13 ins.; pp. 131; two folding maps.

The best way of utilizing the Murray River in the interests of the three Australian states, New South Wales, Victoria, and South Australia, is the subject of this report. The commissioners took evidence on and considered in detail the total flow of the stream, the claims of each state upon its waters and measures "for regulating the flow so as to secure the full use of the river for all purposes." Much interesting information is presented on these and related subjects. The main conclusion of the Commission was that the irrigation uses should take precedence of all others. This conclusion was in accordance with strong and interesting evidence presented by Mr. Elwood Mead, M. Am. Soc. C. E., Chairman State Rivers and Water-Supply Commission, and Chief Engineer of the Water-Supply Department of the State of Victoria.

BROWN'S DIRECTORY OF AMERICAN GAS COMPANIES.—Gas Statistics. Compiled and corrected annually by E. C. Brown. New York: "Progressive Age." Cloth; 7 × 10¾ ins.; pp. 508. $5.

A new feature of this well-known manual is an appendix containing brief historical and financial statistics relating to a number of the more important companies included in the main part of the book. The regular directory, besides giving the names of leading officers of the various companies and the amount of their stock and bonds, presents a general idea of the character and extent of each plant and a statement of output, prices, etc.

WATER SUPPLY PAPER, U. S. GEOLOGICAL SURVEY.—Geo. Otis Smith, Director. Washington, D. C.: Pub. Doc. Paper; 6 × 9 ins.; pp. 94; map and two plates. No. 239. The Quality of the Surface Waters of Illinois. By W. D. Collins.

An idea of the aim and contents of this report may be gained from the following sentences, taken from the Introduction:

This report furnishes the means of stating with fair accuracy the quality of water which may be found at any point along the larger streams within or bordering the State of Illinois. It also includes some explanation of the variations in the quality of the water at different times and places. The natural and economic features which determine the character of the streams are considered in a general way.

WHOLESALE PRICES, 1890 TO MARCH, 1910.—Bulletin No. 87, Bureau of Labor, Department of Commerce and Labor. Washington, D. C.: Pub. Doc. Paper; 6 × 9 ins.; pp. 708.

With each yearly addition of figures this compilation of wholesale prices in the United States becomes more valuable. The prices given in the present compilation relate to 257 commodities. Many tables and some diagrams are given, accompanied by explanatory text.

This number of the Bulletin also contains interesting information on prices and on cost of living in some European countries, and a brief statistical compilation of "Wages and Hours of Labor of Union Carpenters in the United States and in English-Speaking Foreign Countries."

GAS AND ELECTRIC LIGHT COMMISSIONERS OF MASSACHUETTTS. Annual Report for the Year 1909, Including Tables from the Annual Returns for the Year Ending June 30, 1909. Boston, Mass.: Pub. Doc. No. 35. Paper; 5¼ × 9 ins.; pp. 231 + cclii.

The usual detailed information regarding gas and electric light plants in Massachusetts, both private and municipal, is reported in this volume. A valuable feature of the report is the tabulation of the prices charged for lighting by various plants in the State. Some important legal decisions relating to lighting companies are given in an appendix. These are followed by reprints of Massachusetts Statutes bearing upon gas and electric light undertakings in Massachusetts.

WATER SUPPLY COMMISSION OF PENNSYLVANIA.—Annual Report, 1908. (Thomas J. Lynch, Secy., South Bethlehem, Pa.) Harrisburg, Pa.: Pub. Doc. Cloth; 6 × 9½ ins.; pp. 109; folding map and 13 plates.

Discussions of obstructions to streams, methods of bank protection, rainfall, droughts in general, the drought of 1908, and floods during 1908 are given in this volume. There is also a special report by the engineer of the Commission (Mr. Farley Gannett) on floods and flood relief measures as related to Turtle Creek.

COMMISSION OF CONSERVATION, CANADA.—Report of the First Annual Meeting held at Ottawa, Can., Jan. 18-21, 1910. (James White, Secy.) Ottawa, Can.: The Mortimer Co., Ltd. Paper; 6¾ × 9¾ ins.; pp. 216; plates and maps.

Various papers and a number of brief committee reports make up this volume. The papers deal with forestry, water-power, public health, and other matters related to the broad subject of Conservation of Natural Resources.

Gillette's Cost Data Enlarged.

HANDBOOK OF COST DATA FOR CONTRACTORS AND ENGINEERS.—A Reference Book Giving Methods of Construction and Actual Costs of Materials and Labor on Numerous Engineering Works. By Halbert P. Gillette, M. Am. Soc. C. E., M. Am. Inst. M. E.; etc., Managing Editor, "Engineering-Contracting." Second edition. Chicago and New York. The Myron C. Clark Publishing Co. Flexible morocco; 4¾ × 7¼ ins.; pp. 1,854; text illustrations and tables. $5.

The first edition of this well-known book was published in 1905 and reviewed in Engineering News in the issue for Nov. 16 of that year. It contained some 610 pages and, according to the author's own estimate, an equivalent of about 250,000 words. This second edition, noted above in the headpiece, contains, 1,854 pp. and "more than a million" words, once more quoting the author. The additional matter is largely made up of extracts from the journal of which Mr. Gillette is editor, with some data collected since the publication of the first edition. The preface of the new edition states that there has been an attempt to make the book useful for engineers as well as contractors by including in it the number of units in a structure of given requirements as well as the costs of those units. The obvious impossibility of thoroughly examining nearly 2,000 closely printed pages prevents us from stating authoritatively the success with which the intention has been carried out, but the examination allowed by the time at our disposal seems to show that the matter of costs still overshadows that of amounts.

There has been a vast amount of labor put into the collection of the data in the book, and the superiority of the second over the first edition is very evident. For those who know how to use such material the value of the book is very great. It seems fair to ask, however, whether its value would not be increased by more condensation, especially condensation of articles evidently reprinted bodily from Mr. Gillette's journal.

As interesting as any other part of the book is the author's defense, in preface and introduction, of cost data as the sovereign remedy for all engineering ills.

A British Book on Reinforced Concrete.

REINFORCED CONCRETE.—Theory and Practice. By Frederick Rings, M. S. A., Architect and Consulting Engineer. London, England: B. T. Batsford. New York: D. Van Nostrand Co. Cloth; 5¼ × 8 ins.; pp. 189; 203 illustrations, mostly in the text. (Ready Reckoner in pocket.) $2.50, net.

The day we received Mr. Ring's book, we also received a copy of a British periodical containing a joint review of two books on concrete, one by Americans and the other by an Englishman. The reviewer prefers the book by his countryman because "it contains more useful information, and that information the more accessible since [the author] writes in English, while the other handbook is American in idiom, grammar and spelling." It is a curious fact that the latter part of that sentence, reversed, expresses our first criticism of Mr. Ring's book. To an American reader the continual reference to British materials and tests, the use of British measures (such, for instance, as the statement that 1 gal. of water weighs 10 lbs.), and the computations all according to the British nomenclature, tend to reduce for American readers the value that the book may have in its own country.

The intention of the book is to "deal with the subject in such a manner as to be intelligible to average students of architecture who have not been required to devote that amount of study to the theory of construction which is demanded of the young engineer." To this end there is the usual description of materials, and construction followed by a theoretical discussion which, from a rather extended knowledge of the "average student of architecture," we would say is far above the capacity of that artistic but hardly mathematically-inclined young gentleman. In view of the great number of books now on the market upon this subject we do not feel that this latest one fills any need. Had the author carried out his intention, particularly in the mathematical treatment, a more favorable impression might have resulted.

A Treatise on the Sun.

VORLESUNGEN UEBER DIE PHYSIK DER SONNE.—By E. Pringsheim, Professor of Physics at the University of Breslau, Germany. Leipzig and Berlin, Germany: B. G. Teubner. Paper; 6¼ × 9¼ ins.; pp. 435; 7 plates and 235 text illustrations. 16 marks; American price, $6.40.

This Solar Physics is one of the most fascinating scientific works we have read in a long time. As a complete summary of the world's study of the sun, it pictures in a way the entire progress of astronomy and astrophysics. The early workers are by no means forgotten in this summary, and indeed the author shows an appreciation of the merits of the early observations that is not always present in scientific treatises. Objectively the text is marked by plentiful references to names, dates and publications, and by excellent illustrations. Subjectively it is distinguished by an unusually easy and engaging style. Whoever has a fair command of German will enjoy reading this book.

MACHINES MARINES.—By P. Drosne. (Part of "Encyclopédie Scientifique," published under the direction of Dr. Toulouse.) Paris, France: Octave Doin & Fils. Cloth; 4¾ × 7¼ ins.; pp. 383; 137 illustrations in the text. 5 francs; American price, $1.50.

Although this book is essentially an analytical study of the marine steam-engine, it contains several descriptive chapters. A section dealing with valve-motions and one dealing with typical constructions of frames, cylinders, bearings and other details belong in this class. The important part of the work, however, is its discussion of the forces acting in the machine, with special reference to vibration, balancing and similar factors affecting marine engines especially.

PUBLIC RECREATION FACILITIES.—The Annals of the American Academy of Political and Social Science. Vol. XXXV., No. 2. March, 1910. Emory R. Johnson, Editor. Philadelphia, Pa.: The Academy. Paper; 7 × 10 ins.; pp. 260; illustrations. $1 per single number.

The symposiums on live questions of the day which make up the special number of "The Annals," issued from time to time, bring together much valuable material otherwise quite unavailable, or to be found only after much search.

After a brief introductory paper on "Parks and Recreation Facilities in the United States," by John Nolen, Cambridge, Mass., the volume before us presents two series of papers: one on typical national, state, county and city parks, and another on "The Social Significance of Parks and Playgrounds." Three papers deal with state forestry in New York, Pennsylvania, and Michigan, and take up the park systems of Essex and Hudson Counties in New Jersey. One deals with the Metropolitan Park system, and others take up city parks of Philadelphia, Chicago, and Madison, Wis. The 16 papers on parks and playgrounds deal with many phases of the subject. They are not all confined to city playgrounds, one being devoted to the Appalachian Mountain Club, and the other to "The Southern Appalachian Park Reserve as a National Playground."

TESTS OF TIMBER BEAMS.—By Arthur N. Talbot, Professor of Municipal and Sanitary Engineering and in Charge of Theoretical and Applied Mechanics. Bulletin No. 41, University of Illinois Engineering Experiment Station. Urbana, Ill.: The University. Paper; 6 × 9 ins.; pp. 77; 18 plates and 25 illustrations.

Believing that on account of the lack of uniformity in wood structure the small size tests of timber pieces do not reveal the true behavior of large sizes of the same material, the University of Illinois, through Prof. Talbot, inaugurated the tests of timber beams described in the pamphlet noted above. These tests were upon 112 timber stringers, 8 × 16 ins. × 15 ft., and 7 × 12 ins. × 14 ft., of longleaf, shortleaf and loblolly pine and Douglas fir, tested as beams with loads applied equally at one-third points of the span length. At the same time smaller pieces were cut from the same sticks and tested according to accepted methods. The detailed report of each test makes very instructive reading.

Examination of the whole series should be made to draw any conclusion therefrom, but in general it may be said that the values derived are considerably lower than those generally recorded in text-books and that the tests on small pieces show that unit values so determined are much lower than those that obtain in the full size pieces.

BULLETIN OF THE SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION.—Vol. XVII. No. 1. Ithaca, N. Y.: The Society (Henry H. Norris, Secy.) Paper; 6 × 9 ins.; pp. 45.

Heretofore the Society for the Promotion of Engineering Education has issued only an annual publication, but it is now thought that the size of the society and the necessity for a more frequent appeal to the members warrant the publication of a monthly bulletin, so an experimental copy has been issued, numbered No. 1 and dated June, 1910. If it bids fair to be appreciated it will be made a fixture.

The first number contains papers and extracts from papers read at the recent annual convention, and notes from the various colleges represented in the membership.

Least Square Adjustment.

THEORIE UND PRAXIS DER AUSGLEICHUNGSRECHNUNG.—By Ing. Siegmund Wellisch. Vol. II.: Probleme der Ausgleichungsrechnung. Vienna and Leipzig: Carl Fromme. Paper; 7 × 10 ins.; pp. 216; 42 text illustrations. 10 marks; American price, $4.

The above second volume together with Vol. I. (issued a few months ago) forms a detailed reference work on Least Square Adjustment for those who command German well enough to read German mathematics. The first volume gives an introduction to the subject and elaborates its theory. The second treats of the application of the theory and its derived procedures to actual observation adjustment. The opening chapter of 50 pages, on theory of errors in two dimensions and in space, is rather outside this range, but its interest makes it worth inclusion. The next 140 pages cover in detail the geodetic application of least squares. A short section following is entitled "Formation of Empirical Formulas," but it does not contain such a full discussion of this tricky detail of practice as we could expect.

IRRIGATION WORKS.—The "Vernon Harcourt" Lectures of 1910. Delivered by Sir Hanbury Brown, K. C. M. G., to the students of the Institution of Civil Engineers, in London, Manchester, Birmingham and Leeds, during February and March, 1910. London, Eng.: Constable & Co., Ltd. Paper; 5½ × 8½ ins.; pp. 34; one folding plate. 1s., net; American price, 40 cts.

Brief notes of various phases of the design and construction of irrigation works compose the two lectures included in this pamphlet. The statement of some of the principles involved is accompanied by a few illustrative examples.

SUBAQUEOUS CONCRETE WORK.—A Paper Read Before the Canadian Society of Civil Engineers, Describing Work Done on the Lachine Canal. By H. R. Lordly, M. Can. Soc. C. E. Montreal, Can.: The Society (C. H. McLeod, Secy.) Paper; 6 × 9 ins.; pp. 22; folding and other plates.

This description of the methods and the machine by which the subaqueous slope walls of the Lachine Canal were protected by an 18-in. layer of concrete is well worth the dignity of a reprint separate from the society proceedings in which it first appeared.

LOCO.—Vol. I., No. 1, May, 1910. H. B. Oatley, Editor. Issued quarterly by Locomotive Club (Schenectady, N. Y.). Paper; 6 × 9¼ ins.; pp. 70 + xiii; illus.

This publication is to be issued quarterly hereafter by a club composed of the engineers and heads of departments connected with the Schenectady Locomotive Works. One of the things best worth while in this number is a history of the Schenectady Locomotive Works, by Mr. Hawley B. Van Vechten. Such publications as this give opportunity for placing on record many matters of great local interest, but which are of too limited general interest to justify their publication in journals of general circulation.

SUPPLEMENTARY INVESTIGATION IN 1909 OF THE FIGURE OF THE EARTH AND ISOSTASY.—By John F. Hayford, Inspector of Geodetic Work, and Chief, Computing Division, Coast and Geodetic Survey. Washington, D. C.: Pub. Doc. Cloth; 8¾ × 11½ ins.; pp. 80; six plates (five in pocket).

The publication to which this is a supplement was noticed in our issue of Oct. 14, 1909. The present volume needs no further explanation.

Advanced Dynamics for Engineers.

VORLESUNGEN UEBER TECHNISCHE MECHANIK.—By August Föppl, Professor in the Technical College at Munich. In six volumes. Vol. IV.: Dynamik. Vol. VI.: Die Wichtigsten Lehren der Höheren Dynamik. Leipzig, Germany: B. G. Teubner. Cloth; 6¼ × 8¾ ins.; pp. 422 and 490; 71 and 30 illustrations in the text. 10 and 12 marks; American price, $2 and $4.80.

There is such a multiplicity of dynamical problems which require a more or less intricate application of mechanics for their solution, that one book can hardly include more than a small selection of them. (The same remark can be made for statical problems, though on the whole these are represented more fully in the current books). Without including such cases as orbital motion, we find enough material of strictly engineering character to fill many large books. In the present two volumes an interesting selection of such problems is found. Most important among them are those covering pendulum vibrations for both one-piece and jointed pendulums; rotation phenomena and critcial speeds of rotation; balancing of marine engines; the gyroscope and the spinning top; and the Schlick damped gyroscope for checking the rolling of ships. A fairly broad discussion of vibrations is also worth note. Most interesting from the theoretical standpoint, perhaps, is a chapter on absolute and relative motion, at the beginning of Vol. VI., which attempts to formulate clear ideas on how the principles of mechanics would or would not be affected if the whole physical system to which they appertain possessed a translatory or rotational motion not perceptible to one within the system.

The two volumes grew out of a single one, being an expansion of Vol. IV. of the original four-volume work (published ten years ago). That a book on Advanced Dynamics for Engineers should reach a third edition within a decade testifies to its merits. The division into two volumes—Vol. IV. giving the simpler part, Vol VI. the more involved part of the subject—should not decrease its value. That the author has a clear way of expressing his thoughts, and strikes a lucky mean between excess of detail and unintelligible conciseness, is a strong point in its favor.

While we cannot here enter on a fuller review of the treatment of the several problems, it is worth special note that the author was Mr. Schlick's theoretical aid in developing the application of the gyroscope to check the rolling of a ship. He therefore treats this subject very fully in the present work. Unfortunately the practical work on gyrostatic monorail cars came too late to find representation; in a future work this will undoubtedly have an even more important place than the theory of the Schlick apparatus. The gyrostatic compass is mentioned, briefly but with sufficient exactness to specify its limitations and the mechanical regulation requirements.

STANDARD SPECIFICATIONS FOR REINFORCED-CONCRETE HIGHWAY BRIDGES.—By Daniel B. Luten. Indianapolis, Ind.: The Author. Paper; 8½ × 13½ ins.; pp. 11. 10 cts.

These specifications contain advertisements which may be cut out to be sent to newspapers, the official notice to bidders and a detailed specification for a reinforced-concrete bridge, all supplied with blanks to be filled out to fit any given bridge and with a key of various changes that varying conditions may require.

MORTALITY STATISTICS, 1908.—Ninth Annual Report, Department of Commerce and Labor, Bureau of the Census, E. David Durand, Director. Washington, D. C.: Pub. Doc. Cloth; 9 × 12 ins.; pp. 705; tables and a few diagrams.

It is gratifying to note that at last a sufficient number of states and cities have been added to the registration area of the United States to bring the total population involved up to more than one-half the total of that of the whole country. Accordingly, the present mortality report covers an estimated population of about 45,000,000. This population is located in 17 registration states, and in 75 registration cities (including Washington, D. C.), in the 31 non-registration states. It may be expected that inclusion in the registration area is conditioned on a "fairly satisfactory" system of registering deaths.

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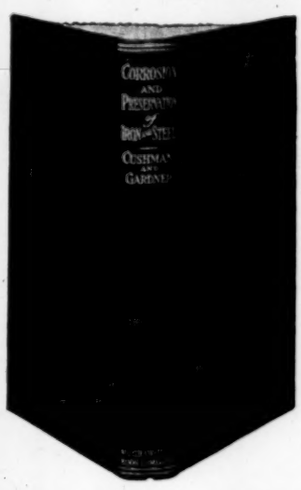

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The greater part of the large volume before us consists of mortality statistics, presented by states, counties, cities, causes and ages. These general tables are preceded by about a hundred pages of text and special tables. The text discusses progress of legislation dealing with vital statistics, and also what has recently been accomplished and attempted in the way of standardization of vital statistics and statistical methods. Next the general statistics presented in this volume are summarized and discussed. The main heads are as follows: Deaths by sex, age, color and nativity, together with infant mortality, urban and rural mortality, and comparisons with the death rates in foreign countries; causes of death, including typhoid fever, tuberculosis and other communicable diseases; occupations and causes of death; and finally deaths by single years of age, with particular attention to deaths of persons of 100 years age and over, and with a few particularly interesting pages of critical comment and citation on centenarians.

It is only just to add that this valuable report was prepared by Dr. Cressy L. Wilbur, Chief Statistician for Vital Statistics, Bureau of the Census. Dr. Wilbur and his associates, both superiors and subordinates, deserve commendation for the relative promptness of the compilation of this report, which was completed early in December, 1909. Advance pages of the matter of most general interest were distributed several months ago.

Publications Received.

THE AMERICAN RAILWAY ASSOCIATION.—Proceedings of the Special Session held in New York City, Jan. 27, 1910; Regular Session held in New York City, May 18, 1910. Circular No. 986. New York: The Association. (W. F. Allen, Gen. Secy.) Paper; 7½ × 10¼ ins.; pp. 268; ten illustrations.

ANNUAL REPORT OF THE COMMISSIONER OF DAMS AND RESERVOIRS.—January, 1910. Providence, R. I.: Pub. Doc. Paper; 6 × 9 ins.; pp. 23; 16 plates.

BOARD OF RAILROAD COMMISSIONERS (Mass.).—Annual Report, January, 1910. Boston, Mass.: Pub. Doc. Cloth; 5¾ × 9 ins.; pp. 606; two folding maps.

BROOKLYN ENGINEERS' CLUB.—Proceedings for 1909, Constitution and By-Laws and Catalog of Reference Works Added to the Library During the Year. Brooklyn, N. Y.: The Club. (Joseph Strachan, Secy.) Cloth; 6 × 9 ins.; pp. 222 + 32; numerous plates; folding map. $2.

BULLETINS U. S. GEOLOGICAL SURVEY.—Geo. Otis Smith, Director. Washington, D. C.: Pub. Doc. Paper; 5¾ × 9 ins.

No. 415: Coal Fields of Northwestern Colorado and Northeastern Utah. By Hoyt S. Gale. Pp. 265; 21 plates; 12 maps (5 in pocket); 6 illustrations.

No. 430-A: Advance Chapter from Contributions to Economic Geology (Short Papers and Preliminary Reports), 1909. Part 1.—Metals and Nonmetals, except Fuels. Gold and Silver. By J. M. Hill, F. L. Hess, D. F. MacDonald, and J. T. Pardee. Pp. 62; four text illustrations.

No. 430-C: Advance Chapter from Contributions to Economic Geology (Short Papers and Preliminary Reports), 1909. Part 1.—Metals and Nonmetals, except Fuels. Lead and Zinc. By Leon J. Pepperberg. Pp. 18; two illustrations.

LE CHAUFFAGE ET LA VENTILATION DES BATIMENTS INDUSTRIELS.—Fascicule II., Bibliothèque de "La Technique Moderne." By G. Debesson, C. E. Paris, France: H. Dunod and E. Pinat. Paper; 9½ × 12¼ ins.; pp. 96; 136 illustrations.

COMMONWEALTH DEMOGRAPHY, 1909, AND PREVIOUS YEARS.—Bulletin No. 19: Population and Vital Statistics. Published under the authority of the Minister of Home Affairs, by G. H. Knibbs, Commonwealth Statistician. Melbourne, Australia: Pub. Doc. Paper; 8¼ × 13 ins.; pp. 54.

LE CONSTRUCTEUR DE PETITS AEROPLANES.—Plans, Grandeur d'Exécution, et Indications pour Construire Quatre Aéroplanes Réduits. By R. Petit. Paris, France: Librairie Aéronautique. Paper; 7½ × 9½ ins.; pp. 16; text illustrations and three folding plates. 1.50 francs; American price, 50 cts.

CONTROL OF RAILROAD ACCOUNTS IN LEADING EUROPEAN COUNTRIES.—By A. M. Sakolski. (Reprinted from "The Quarterly Journal of Economics," Vol. XXIV., May, 1910.) New York: Hay & Boynton. Paper; 6 × 9 ins.; pp. 27.

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THE DETERMINATION OF THE PLANE OF ORDINARY HIGH TIDE FOR PACIFIC COAST HARBORS, WITH PARTICULAR REFERENCE TO SAN DIEGO HARBOR, CALIFORNIA.—A Discussion. By D. E. Hughes and Otto Von Geldern. (Reprinted from "Journal of the Association of Engineering Societies," Vol. XLIV., No. 4.) Paper; 6 × 9 ins.; pp. 35; one plate and two text illustrations.

DICTIONARY OF METALLURGICAL AND CHEMICAL MACHINERY, APPLIANCES AND MATERIAL.—Manufactured or Sold by Advertisers in Metallurgical and Chemical Engineering. Second edition. New York: Metallurgical and Chemical Engineering. Paper; 4½ × 7¼ ins.; pp. 219. 50 cts.

ENTWURF EINES WASSERKRAFTWERKES IM GEBIET DER MURG OBERHALB FORBACH.—By Th. Rehbock, Professor in the Grand-ducal Technical College "Friedericiana" at Karlsruhe. Second enlarged edition. Leipzig, Germany: Wilhelm Engelmann. Paper; 8¼ × 13 ins.; pp. 65; 30 plates and 2 text illustrations. 7.60 marks; American price, $3.

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THE FOUNDATIONS OF ALTERNATE CURRENT THEORY.—By C. V. Drysdale, M. Inst. E. E. New York: Longmans, Green & Co. London, England: Edward Arnold. Cloth; 5½ × 8¾ ins.; pp. 300; 195 illustrations in the text. $2.50, net.

GEOLOGIC ATLAS OF THE UNITED STATES.—U. S. Geological Survey, Geo. Otis Smith, Director. Washington, D. C.: Pub. Doc. Stiff paper; 18½ × 21¾ ins.

Laramie-Sherman Folio, Wyoming. By N. H. Darton, Eliot Blackwelder and C. E. Siebenthal. Pp. 17; eleven plates, seven maps and three text illustrations.

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